

Combined treatment of alveolar bone defect caused by subgingival cement remnants, 4 years results: A case report

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Abstract

Cement remnants are known as a cause of periodontal abscess in which periodontal tissues may be rapidly destroyed. The aim of the present case report was to show the 4-year hard and soft tissues stability of bone grafts in the treatment of intrabony defects. A 54 years old female patient who had recurrent periodontal abscess on tooth 33 were examined clinically and radiographically at baseline. Periodontal examination revealed a 11 mm probing depth (PD) and clinical attachment level (CAL) on the distal aspect of the tooth. Cement remnants on the mesial surface of the root was observed radiographically. After elimination of cement remnants, scaling and root planing (SRP) were performed and oral hygiene instructions were given. An intrabony defect with 9 mm PD was detected following SRP and defect was treated with xenogenic bone graft (Bio-Oss®) at 3 months following SRP. At 3 months after the grafting procedure, coronally advanced flap with connective tissue graft was performed. Surgical procedures were successfully applied to defect side, resulting in an uneventful postsurgical period and substantial defect fill over the 12 months. Clinical follow-up recalls were planned yearly, while intra-oral radiographs were performed at 1 year, 2 year and 4 years after the surgery. The latest follow-up visit performed after 4 years from the surgical procedures showed clinically stable gingival levels. No radiographic signs of bone loss were observed. This case report highlighted the effectiveness of the xenograft materials and increasing gingival tissue thickness over a long-term follow-up.

Keywords

bone regeneration; bone graft; connective tissue; periodontal abscess

Abbreviations

PD: Probing depth; CAL: Clinical attachment level; SRP: Scaling and root planing; BDXBovine derived xenografts

Introduction

Periodontal diseases are infectious diseases characterized by inflammation and destruction of periodontal tissues, which develop due to complex relationships between pathogenic microorganisms and host [1]. Although microbial dental plaque is shown as primary cause of periodontal diseases, genetic, environmental and iatrogenic factors play an important role in the development of the disease [2,3]. Iatrogenic factors such as overcountered restorations and excess cement remnants can be predisposing factors for periodontal abscess development. Periodontal bone defects related with deep pockets are considerable anatomical sequelae to periodontal abscess [4]. Although, the primary goal of periodontal therapy is solving the inflammation with successful cause related treatment, regeneration of lost tissues in order to sustain periodontal health after treatment becoming very important.

Periodontal regeneration is defined as restoration of lost or diminished of the tooth's supporting tissues, including alveolar bone, periodontal ligament, and cementum [5]. Various regenerative procedures have been defined in the literature such as open flap debridement with bone graft alone or combination with guided tissue regeneration and/or biologic modulators [6,7]. Allografts, xenografts and alloplasts are widely used bone replacement grafts for the treatment of infrabony defects [8,10-13]. Xenografts have good osteoconductive qualities and it is reported that using xenografts can provide improved clinical outcomes such as probing depth reduction and clinical attachment gain, when compared to open flap debridement alone [11-13].

This case report describes the successful management of such a defect, treated with bovine derived xenograft and coronally advanced flap with connective tissue graft to increase the gingival thickness after 4 years.

Case Report

A 54-year-old female patient came to Periodontist's attention (E.C) with the chief complaint of mild pain and recurrent periodontal abscess in relation to her lower canine. The prosthesis was located in the lower canine and second molar and had been placed three years before. Clinical examination revealed periodontal pockets exceeding 11 mm in depth and 11 mm. clinical attachment level (CAL) surrounding the distal aspect of lower canine. Bleeding were detected at the distal and buccal sites of the tooth. No other pockets or attachment/bone loss were detected in other sites of the mouth. Her full-mouth plaque and bleeding scores were both %25 and she was not smoking.

The patient's medical history was received chemotherapy radiotherapy for breast cancer treatment 10 years ago and dental history was having periodontal abscess 3-4 times last 1 year. After removing the prosthetic restoration, intraoral X-ray was performed before the periodontal treatment (Figure 1). Severe bone loss with a deep bony defect on the distal aspect of the lower canine and cement remnants on the root surface was observed. Electric pulp testing showed response, tooth was vital and had a degree 2 mobility after elimination of cement remnants, scaling and root planing were performed and oral hygiene instructions were given. Three months following scaling and root planing the patient's plaque and bleeding were

<20%, CAL was 11 mm and PD was 9 mm associated with an intrabony defect. Therefore, access flap surgery and grafting procedure were planned. Before all surgical procedures oncology consultation was performed and patient signed an informed consent form in agreement.

Surgical Procedure

Infiltration anesthesia was achieved by an injectable solution including 2% lidocaine and 1/100.000 epinephrine (Jetocaine, Adeka Pharmaceuticals, Turkey). Following control of anesthesia, full-thickness mucoperiosteal flap was elevated by using papilla preservation flap technique. For better access, 3 mm horizontal incision was performed on alveolar crest distally. The periodontal defect was thoroughly debrided. The defect involved also the lingual side and 6 mm intrabony defect extending on three of the four surfaces of the tooth was present. While 2-wall osseous defect was extended to apical third of the root and only the deepest part of the defect had 3 walls. The intrabony defect was filled with the bovine derived xenograft (Bio-Oss, Geistlich Pharma AG, Wolhusen, Switzerland) till the defect walls (Figure 2). After grafting, flaps were repositioned and primary closure with vertical mattress and interrupted sutures were achieved by using 5.0 polypropylene (Doğsan Surgical Sutures, Turkey) suture material and maintained during the healing period. Patient was instructed to rinse with 0.2% chlorhexidine gluconate (Klorhex, Drogosan Pharmaceuticals, Turkey) for 2 weeks, use flurbiprofen tablet (Majezik, Sanovel Pharmaceuticals, Turkey) three times per day and amoxicilin + clavulanic acid (Augmentin, Glaxo Smith Kline Pharmaceuticals, UK.) two times per day for 1 week. She was also instructed to abstain from brushing the surgery site for 2 weeks. The surgical site were healed uneventfully. The sutures were removed at second week following the surgeries when the flap and root-soft tissue interface was stable.

Mucogingival Surgery

Three months after the grafting procedure, a 3 mm residual recession associated with 1 mm probing depth (PD) was measured. Coronally advanced flap with connective tissue graft was applied for achieving sufficient keratinized tissue width and thickness on buccal side (Figure 3). The patient showed good compliance and satisfactory oral hygiene maintenance during the course of observation period. Clinical periodontal parameters were recorded at baseline, 1 year, 2 years, 4 years and standard photographs were taken. Clinical re-evaluation at 1 year after the grafting procedure revealed PD of 4 mm and CAL of 4 mm with no signs of bleeding on probing. The tooth remained vital. The deep intrabony defect associated with periodontal abscess were resolved and periodontal tissues have preserved their healthy status for 4 years (Figure 3). Digital radiographic re-evaluations were performed at 6 months, 1 year, and 4 years post-operatively. The radiographic examination showed defect fill when compared to preoperative images (Figure 4).

Discussion

Periodontal abscess are localized purulent collection in the periodontal tissues which is related with pocket formation and bone destruction [5]. Periodontal abscesses are not only caused by bacterial infections but also developed in the absence of periodontitis due to impaction of foreign bodies (such as a piece of dental floss or a toothpick, cement remnants around fixed prothesis or an unknown object). The

role of the cement remnants in the development of periodontal abscesses may be similar to function of dental calculus in the etiology of periodontal diseases. Cement remnants have a rough surface and cause additional retention of bacteria and mechanical irritation [21]. Presence of an abscess may lead to extraction of the involved tooth in many cases. Thus, accurate diagnosis and treatment of the abscesses is very important.

Commonly, deep infrabony defects are resulted as a sequelae of periodontal abscess. Sites with infrabony lesions have a high risk for disease progression during maintenance phase of therapy [22]. After a successful cause related therapy, access flap surgery combination with bone resective techniques or regenerative procedures can be required in order to reduce infrabony component of the defect. Open flap debridement with bone graft alone or combination with biologic modulators and guided tissue regeneration techniques have been commonly used regenerative procedures [6,7].

Autogenic, allogenic, xenogenic and alloplastic graft materials have been commonly used for periodontal tissue regeneration [8,10-13], but none of them has been proved as a gold standard in the treatment of intrabony defects, because of their own limitations [9]. Xenografts can be derived from other species including bovine, equine and coral [5,14]. It is reported that, while production of xenografts, cells, organic, and proteinaceous materials are removed in order to leave inert bone scaffold. This structure facilitates revascularization, osteoblast migration, and new bone formation [13,15]. Bovine derived xenografts (BDX) have good osteoconductive qualities and can be well integrated into bone tissue [16-20]. Also, by osteoclastic activity, graft material can be resorbed slowly [16,17,20]. According to the histological and clinical studies BDX is a well tolerated material and, until now, no allergic reactions have been reported [18-20].

For treatment of periodontal intrabony defects, using xenografts can provide improved clinical outcomes such as probing depth reduction and clinical attachment gain, when compared to open flap debridement alone [11-13].

In addition to these, defect anatomy is very important in the treatment of intrabony defects [23]. Intraosseous components of the defect provide a good blood supply and space maintenance for bone graft material. It has been demonstrated that bone fill and clinical attachment level gain in three or two walled intraosseous defects was greater [23,24].

In the present report, there was a considerable reduction in pocket depth (7 mm) and clinical attachment level gain (7 mm) 12 months after bone grafting procedure and mucogingival surgery. Also, complete bone fill at 12 months was observed radiographically. The deep intrabony defect associated with periodontal abscess were resolved and periodontal tissues have preserved their healthy status for 4 years. These results can be associated with:

- 1) 2 and 3 walled defect anatomy
- 2) good osteoconductive properties of xenograft material
- 3) successful supportive periodontal treatment.

Figures

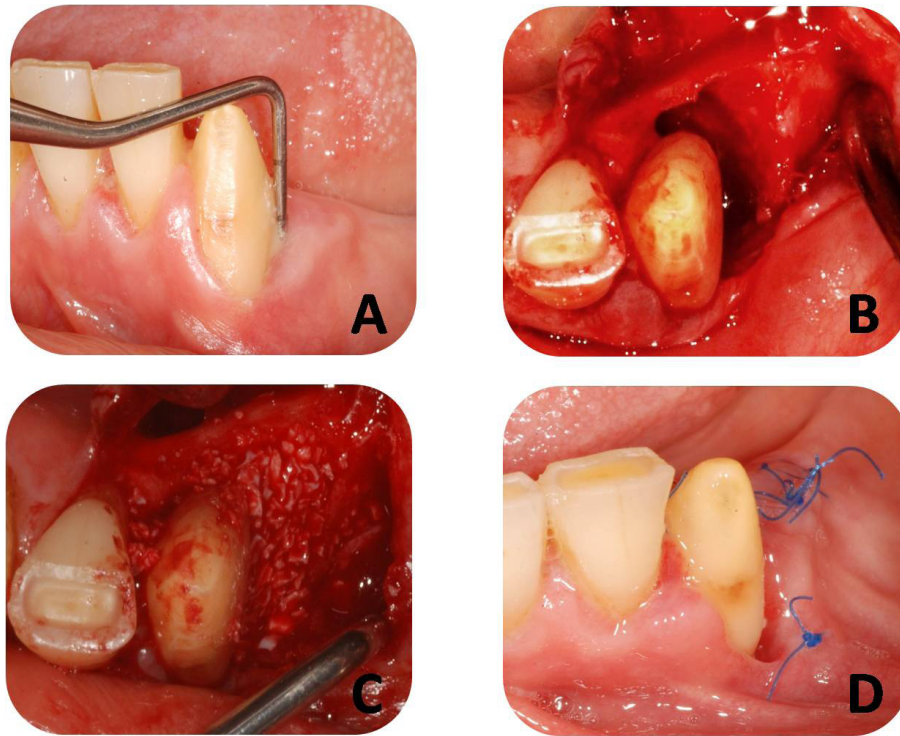


Figure 1: Bone grafting procedure. (A) 3 months following scaling and root planing, 9 mm pocket at distal aspect of the tooth 33. (B) 2-wall osseous defect extending to apical third of the root. (C) defect fill with the bovine derived xenograft (Bio-Oss). (D) 2 weeks after grafting procedure.

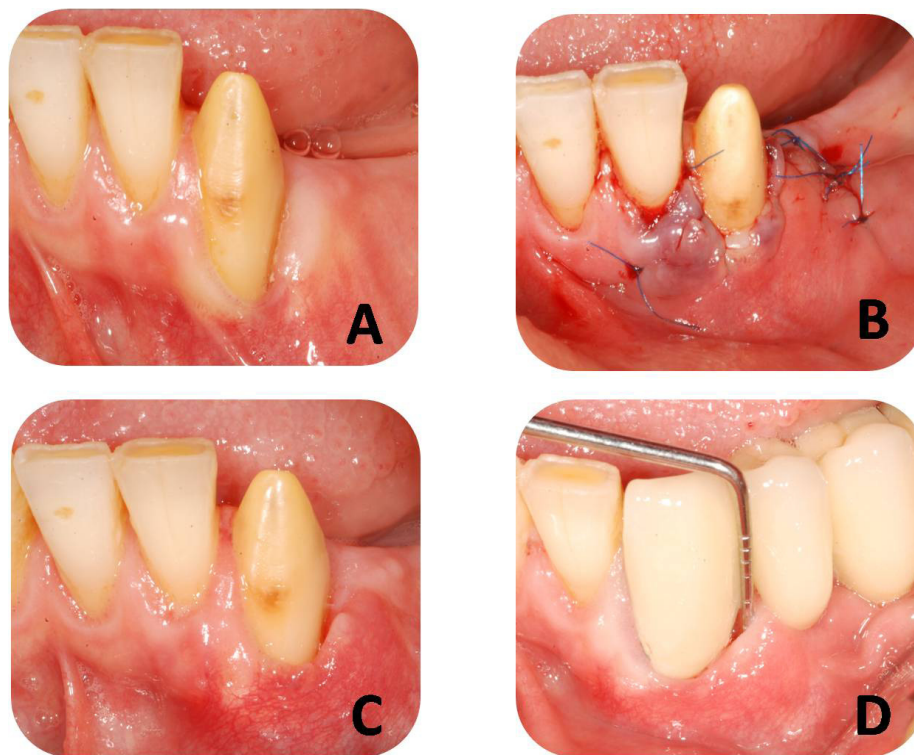


Figure 2: CTG procedure and 1 year following (A) 3 months following bone grafting procedure. (B) Coronally advanced flap with CTG (C) 6 months. (D) 1 year.

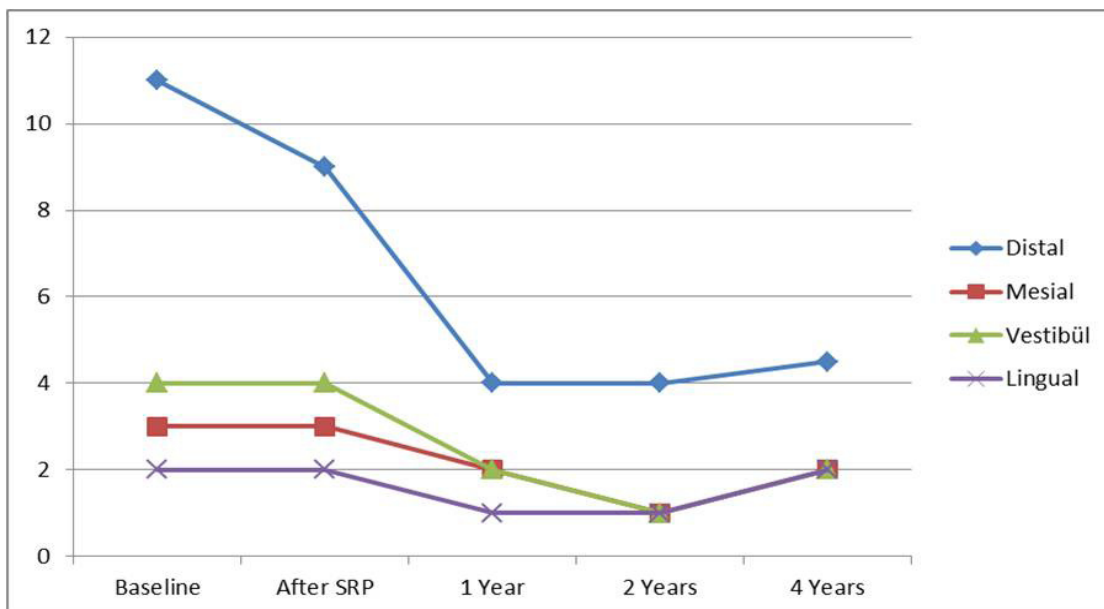


Figure 3: Clinical attachment level at baseline, after SRP, 1 year, 2 years and 4 years

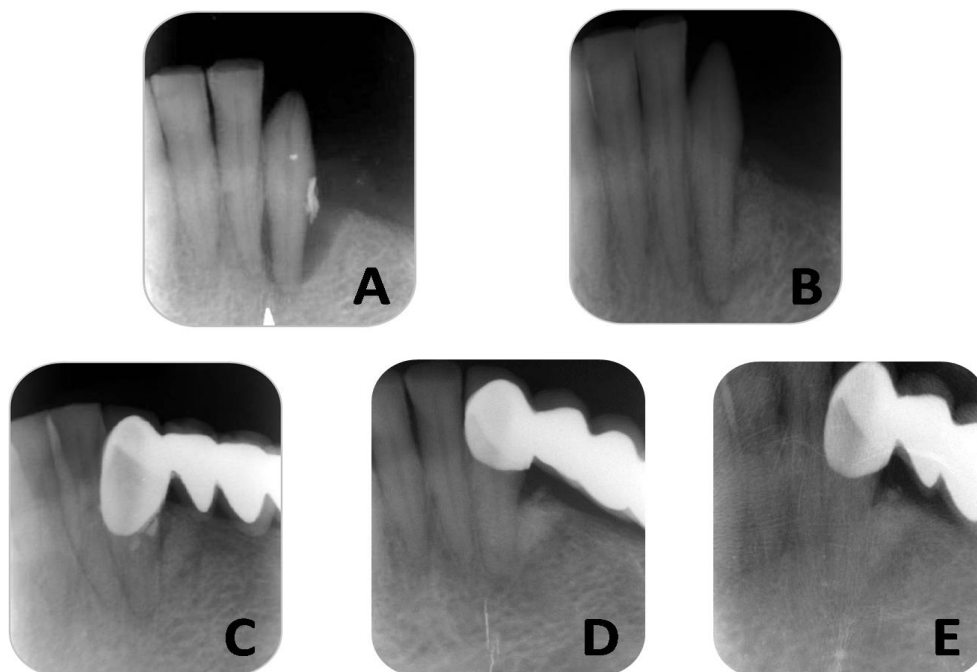


Figure 4: Radiographic examinations (A) Baseline (B) 6 months after bone grafting procedure. (C) 1 year. (D) 2 years. (E) 4 years.

Conclusion

In conclusion, this case goes to show that xenograft materials can be used for the treatment of deep intrabony defects effectively. Bone grafting procedure provides complete resolution of the defect and considerable reduction at probing depth and clinical attachment level gain. Additional studies, including larger samples, comparison of different materials and inclusion of different sites, like the anterior region, that might show more pronounced changes, are needed in order to confirm and supplement the present findings.

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